REMARKS

Claims 1-46 were pending in the application. By this Amendment, new claim 47 is added. The status of the claims is as follows:

Claims 6-26 and 30-43 are withdrawn from consideration.

Claim 47 has been added.

Claims 1-5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,920,409 to Yamagishi ("Yamagishi").

Claims 27-29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamagishi as applied to claims 1-5 above in view of U.S. Patent No. 6,414,669 B1 to Masazumi ("Masazumi").

To date, the Request for Approval of Proposed Drawing Changes filed on August 16, 2001 (mailed to the Patent and Trademark Office on August 13, 2001) have not been approved. Applicants respectfully request that these changes be approved in order that Replacement drawings can be filed.

Claim 1 has been amended to more completely describe the present invention. The new elements in claim 1 are described in paragraphs [0031]-[0033] of the present specification and are illustrated in FIG. 2. These changes do not introduce any new matter.

Claims 45 and 46 have been amended to reflect the change in antecedent basis based upon the amendments to claim 1. These changes are not necessitated by the prior art, are unrelated to the patentability of the invention over the prior art, and do not introduce any new matter.

35 U.S.C. § 103(a) Rejections

The rejection of claims 1-5 under 35 U.S.C. § 103(a), as being unpatentable over Yamagishi, is respectfully traversed based on the following. The Office Action includes claims 44-46 in the discussion of Yamagishi. As it is presumed the Examiner intended to reject claims 44-46 over Yamagishi, these claims will be discussed as if rejected over Yamagishi.

Amended claim 1 includes the limitations of scanning and signal electrode drivers connected to first scanning and signal electrodes, respectively. Further, claim 1 includes the limitation of a controller for controlling the scanning and signal electrode drivers such that "the scanning electrode driver selects the first scanning electrodes in a specified order by outputting a selective signal to each of the first scanning electrodes and the signal electrode driver outputs signals to the plurality of signal electrodes in accordance with image data to display the pixels on the row of the matrix corresponding to the selected scanning electrode." In other words, the scanning electrode driver has a specific function of selecting the scanning electrodes in a specified order, while the signal electrode driver has a specific function of outputting signals in accordance with image data. One of the major differences between the scanning and signal electrode drivers is that the scanning driver output is completely independent of the image data, while the signal driver output is dependent upon the image data. Therefore, because the scanning and signal electrode drivers serve very different functions, they cannot be interchanged. Similarly, because the first scanning electrodes are driven by very different signals than the plurality of signal electrodes, the first scanning electrodes cannot be interchanged with the plurality of signal electrodes.

The Office Action asserts Yamagishi discloses all of the features of claim 1-3 except for the inverse arrangement of the scanning and signal electrodes, which could simply be renamed without changing any property of the display. However, as noted above, simply interchanging the electrodes will not result in the invention of claim 1. By merely changing the name of the electrodes in Yamagishi, the result would be a display

having a grossly distorted image. Fig. 1 of Yamagishi shows a three-color pixel that is 1.5 times longer in the Y-direction than in the X-direction. After "renaming" the electrodes, the three-color pixel would be 6 times longer in the X-direction than in the Y-direction. This resulting display would be counter to all efforts to improve displays by reducing the "dot-pitch." Such a long, narrow pixel would especially distort the color portion of the image so badly that the viewer would find the display to be unacceptable. A three-color pixel according to Yamagishi is illustrated on the left of Fig. 1 below, while a three-color pixel created by renaming the electrodes, drawn to the same scale, is illustrated on the right of Fig. 1.

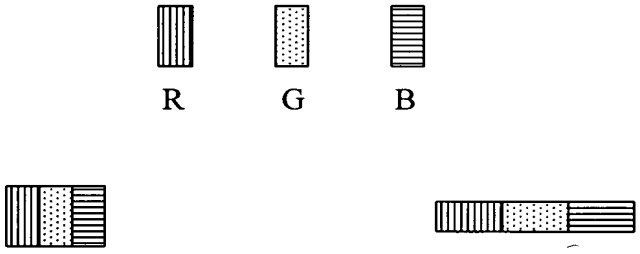

Fig. 1

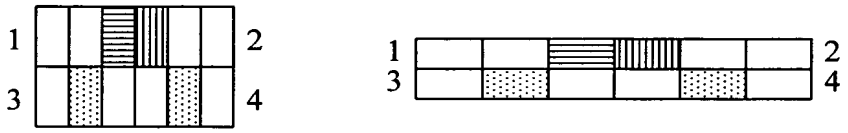

Fig. 2

The human eye will smooth the separation of the three color portions in a small area, such as the left pixel of Fig. 1, such that all three colors appear to be coming from the same point. In contrast, the human eye cannot smooth the separation of the three color portions in the "renamed" pixel on the right of Fig. 1, resulting in unacceptable images due to the elongated nature of the renamed pixel. As a more concrete example, Fig. 2 shows the same pixels in which pixel 1 is blue, pixel 2 is red, and pixels 3 and 4 are green. Again, due to the very elongated nature of the renamed pixels on the right of Fig. 2, there

is a very clear difference. Thus, as Figs. 1 and 2 clearly show, merely changing the name of the scanning and signal electrodes, contrary to what the Office Action asserts, would drastically change the property of the display.

The Office Action also notes that it is not clear how the present invention, in which the pitch of the signal electrodes is greater than the pitch of the scanning electrodes, reduces blackout. The reason the present invention reduces blackout is explained in detail in paragraphs [0064]-[0066], and corresponding FIGs. 6-9 of the present application. The following is a brief summary of how the invention reduces blackout for an embodiment in which the signal electrode pitch is twice the scanning electrode pitch, as illustrated in FIGs. 6-9 of the present application. In the embodiment of FIG. 6, a line is blacked out for approximately half the time, while it displays an image for approximately half the time, as shown in greater detail in FIG. 7. For an interlaced scanning technique, FIG. 6 shows line 1 and line 2 are opposite, that is, line 1 is blacked out while line 2 displays an image, and vice-versa. A portion of the display, illustrated in FIG. 8b, shows the letter A, while FIGs. 9a and 9b show the letter A during the two interlace writing phases. As can be seen, no portion of the letter A is completely blacked out during either of the two interlace writing phases. In contrast, when the scanning and signal electrodes have the same pitch, as shown in FIG. 8a, significant portions of the letter A would be blacked out during both of the interlace writing phases. When the odd lines are displayed in FIG. 8a with the even lines blacked out, the top of the A and the cross bar to the A would be blacked out and the letter impossible to determine. Such is clearly not the case in FIG. 8b, as when the odd lines are displayed and the even lines blacked out, a portion of all horizontal lines and all vertical lines will be displayed. In other words, by forming a display with a signal electrode pitch twice that of the scanning electrode pitch (FIG. 8b), features of an image will not be entirely blacked out as they would be when the pitches are equal (FIG. 8a). Thus, the present invention results in a display in which images do not flicker from the display and blackout phases inherent in an interlace scanning system.

In summary, the present invention advantageously minimizes blackout in a liquid crystal display apparatus due to the limitation regarding the relationship between the pitches of the scanning and signal electrodes. Furthermore, the present invention is not disclosed or suggested by merely changing the name of Yamagishi's electrodes as this grossly distorts the displayed image. Because Yamagishi does not disclose or suggest at least claim 1's limitation regarding the relationship between the pitches of the scanning and signal electrodes, Yamagishi cannot render obvious the invention of claim 1.

Claims 2-5 and 44-46 depend from claim 1. As Yamagishi does not render obvious the apparatus of claim 1, it cannot render obvious the apparatuses of claims 2-5 and 44-46 for at least the same reasons.

Accordingly, it is respectfully requested that the rejection of claims 1-5 (and 44-46) under 35 U.S.C. § 103(a) as being unpatentable over Yamagishi, be reconsidered and withdrawn.

The rejection of claims 27-29 under 35 U.S.C. § 103(a), as being unpatentable over Yamagishi as applied to claims 1-5 above in view of Masazumi, is respectfully traversed based on the following.

As discussed above, Yamagishi fails to render obvious the invention of claim 1. Masazumi similarly fails to disclose or suggest each limitation of claim 1. Fig. 4 of Masazumi illustrates a liquid crystal display apparatus in which the pitch of the scanning and signal electrodes appear to be equal. Further, the corresponding portion of Masazumi (col. 10, lines 36-46) fails to disclose or suggest the pitch of the signal electrodes is wider then the pitch of the scanning electrodes. Because the combination of Yamagishi and Masazumi fails to disclose or suggest at least one limitation of claim 1, the combination of Yamagishi and Masazumi cannot render obvious the apparatus of claim 1. Claims 44-46 depend from nonobvious claim 1 and are nonobvious for at least the same reason.

Accordingly, it is respectfully requested that the rejection of claims 27-29 under 35 U.S.C. § 103(a) as being unpatentable over Yamagishi as applied to claims 1-5 above in view of Masazumi, be reconsidered and withdrawn.

New Claim

New claim 47 corresponds to the first embodiment of the present application as described in paragraphs [0021]-[0067]. Therefore, claim 47 introduces no new matter. Claim 47 includes the limitation that the pitch of the pixels in the row direction (formed by the signal electrodes) is wider than the pitch of the pixels in the column direction (formed by the first scanning electrodes). As discussed above, neither Yamagishi, nor the combination of Yamagishi and Masazumi, disclose or suggest such a relationship between the pitches of signal and scanning electrodes. Therefore, claim 47 is nonobvious over the applied art.

CONCLUSION

In view of the foregoing, this application is considered to be in condition for allowance, and an early reconsideration and a Notice of Allowance are respectfully requested.

This Amendment increases the number of independent claims by one (from 3 to 4) and increases the total number of claims by one (from 46 to 47), but does not present any multiple dependency claims. Separately, if an extension of time is required to enable this document to be timely filed and there is no separate Petition for Extension of Time filed herewith, this document is to be construed as also constituting a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) for a period of time sufficient to enable this document to be timely filed.

Accordingly, a Response Transmittal and Fee Authorization form authorizing the amount of $250.00 to be charged to Sidley Austin Brown & Wood LLP's Deposit Account

No. 18-1260 is enclosed herewith in duplicate. However, if the Response Transmittal and Fee Authorization form is missing, insufficient, or otherwise inadequate, or if any fee pursuant to 37 C.F.R. §§ 1.16 and 1.17, other than the issue fee, is required by this response, please charge such fee to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260. Any refund should be credited to the same account.

Respectfully submitted,

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